Graduate School has the recognition and hearty support of the University authorities.

I. M. LEWIS, *Corresponding Secretary.*

CHAPTER REPORTS

THE CORNELL CHAPTER

The chapter has had twelve meetings during the year 1914-15, at ten of which lectures were given. Nine of these lectures were open to the public. The titles follow:

Research in Forestry.....Professor A. B. Recknagel
Bob Veal.....Doctor P. A. Fish
The Steam Turbine.....Professor W. N. Barnard
X-Rays and Crystalline Structure...Professor W. H. Bragg, F.R.S.
The Desiccation of Food Products....Professor G. W. Cavanaugh
The Experimental Investigation of Memory..Professor H. P. Weld
Some Recent Advances in Morphology of the Sound Transmitting Apparatus of Vertebrates.....Professor H. D. Reed
What Science Has Done for Floriculture...Professor E. A. White
Glimpses of Samoa.....Mr. J. T. Lloyd
Some Recent Developments in X-Ray Apparatus and Applications.....Professor J. S. Shearer

At the annual meeting held for the purpose the chapter elected the following new members:

MEMBERS OF THE FACULTY OF CORNELL UNIVERSITY (7)

Albert Le Roy Andrews, A.M., Harvard, 1903; Ph.D., Kiel, 1908; Instructor in German.

P. Notes on North American Sphagnales; Sphagnales: A Monograph of the Order in North American Flora. I. Studies of Mosses.

William Trowbridge Merrifield Forbes, A.B., Amherst, 1906; Ph.D., Clark, 1910; Assistant in Entomology.

P. Field Tables of Lepidoptera; New England Caterpillars, and other publications. I. Text book of Lepidoptera of Eastern North America.

Frank Erhart Emmanuel Germann, A.B., Indiana, 1911; Dr. es Sc. Geneva, 1914; Instructor in Physics.

Following each name is a list of research titles, in some cases only partially complete, indicating the work upon which nomination is primarily made, with symbols prefixed as follows:
P=Published articles or books.
C=Completed research not published.
I=Incomplete research in progress.

P. Eine Bestimmung der Dampfdruck des Sauerstoffs; Analyse de tres petites quantites de gaz, and other publications. I. The Absorption Spectra of Liquefied Gases.

David Kennedy-Fraser, B.Sc., Edinburgh, 1908; M.A., Edinburgh, 1909; Assistant Professor of Education.

P. Influence of Margins on the Process of Bisection: Additional Experiments with Observations on the Affective Character of the Determinations; Teachers' Estimates of Intelligence in their Pupils. I. Experimental Investigation of Rhythm.

Earl Max Pickens, D.V.M., Cornell, 1911; A.M., Cornell, 1914; Assistant Professor Veterinary.

P. An Outbreak of Anthrax due to Tannery Refuse; The Determination of Anthrax by means of the thermo-precipitation Reaction. I. Leukemia in Fowls, (others in progress).

Ernest William Rettger, A.B., Indiana, 1893; Ph.D., Clark, 1898 Assistant Professor in C.E.

P. Shorter Proof of Castigliano's Theorem; The Proportional-Flow Weir; (Three other titles).

James Batcheller Sumner, A.B., Harvard, 1910; A.M., Harvard, 1913; Ph.D., Harvard, 1914; Assistant Professor in Bio-Chemistry.

P. Note on Some Compounds of Piperonyloin; The Formation of Urea without the Liver. I. Urea Formation.

Graduate Students

Walter H. Burkholder, A.B., Wabash, 1913; Fellow in Plant Pathology.

P. The Perfect Stage of the Fungus of Raspberry Anthracnose. C. A Monographic Study of the Raspberry Anthracnose Disease.

Josephine Nash Curtis, B.A. Wellesley, 1910; M.A. Wellesley, 1912; Sage Fellow in Psychology.

P. On Psychology as Science of Selves. C. An experimental Study of Duration (Thesis).

Otis Freeman Curtis, A.B., Oberlin, 1911; Instructor in Botany.

P. Picro-nigrosin, a combination fixative and strain for algae. I. Physiological Study of the Rooting of Cuttings of Woody Plants.

Daniel Sheets Dye, B.S., Dennison, 1907.

C. The Effect of Temperature on the Phosphorescence of Willemite. I. An Experimental Study of the Decay of the Phosphoresence of Willemite.

William Carlyle Etheridge, B.Agr., N. C. A. and M. College, 1906; M.S., Same, 1908; M.S. in Agr., Cornell, 1912; Assistant in Farm Crops.

P. Corn Plant Characters Associated with Yield and Factors Influencing Them; Economic Value of Corn Tillers; The Scuppernong as a Profitable Crop. C. Influence of Certain Sugars upon Production and Activity of Diestase from certain Fungi; I. Classification of American Varieties of Oats.

Gladys May Frary, A.B., Stanford, 1914.

I. On the Fibre Tracts in the Brain and Spinal Cord of the Bird.

Samuel Alexander Goldberg, D.V.M., Cornell, 1914; Assistant in Vet.

C. Erosive Osteo-arthritis in a Calf. I. Differentiation between Bacterium pullorium and Bacterium sanguinarium; Diseases of Bones (Thesis).

Cedric Hay Guise, B.S., Cornell, 1914; Assistant in Forestry.

I. Possibility of Private Forest Management in N. Y. State (Thesis).

Ira Myron Hawley, B. Mich. 1909; Assistant in Entomology.

I. A Detailed Investigation of Insects Injurious to Hops.

Reuben Lorenzo Hill, B.S., Utah Agr. College, 1912; Assistant in Bio-Chem.

P. On the Relative Intolerance of Sheep to Sub-cutaneous Administration of Glucose; (Seven other titles). I. Galactagogue Properties of Pituitrin.

Ruby Beatrice Hughes, A.B. Western College, 1911.

I. Local Distribution as Studied by the Tent-trap Method.

Jacob Oscar Jones, B.S., Kansas, 1912; Fellow in C.E.

I. Precision of Weir Methods as Affected by the Sharpness of Crest.

John Joseph Kennedy, B.Chem., Cornell, 1913; Assistant in Chem.

I. Para-diethyl-amino-meta-hydroxy-benzoyl-ortho-benzoic Acid and Some of Its Derivatives (Thesis).

Olney Brown Kent, B.S.Agr., Cornell, 1913; M.S.A., Cornell, 1914; Instructor in Poultry Husbandry.

P. Method of Selecting the High Producing Hens (collaborator). I. (Continuation of the above.)

Hugh McMillan Kingery, A.B., Wabash, 1908; A.M., Same, 1909; Instructor in Histology.

P. On the so-called Parthenogenesis in the White Mouse. I. On the Oogenesis in Mus musculus (Thesis). C. Technique Notes.

Millard Alschuler Klein, B.S., Nebraska, 1910; Ph.D., Cornell, Feb. 1915.

C. Studies in the Drying of Soils.

Taun Shin Kuo, B.S., Cornell, Feb. 1914; M.S.A., Same, Feb. 1915.

C. Influence of Certain Salts upon the Production of Nodules by Vetch.

Mortimer Demarest Leonard, B.S., Cornell, 1913; Assistant in Entomology.

P. Venational Variation in Cladura (collaborator); (Ten other titles). C. The Relation of Certain Insects to the Transmission of Fire-blight in Nursery Stock, etc.

Rowland Willis Leiby, B.S., Muhlenberg, 1912.

C. Pupal Instar of archips argyrospila; The Fruit-Tree Leaf-roller.

Louis M. Massey, A.B., Wabash, 1912; Instructor in Plant Path.

I. Gladiolus Diseases.

Leonard Amby Maynard, A.B., Wesleyan, 1911; Fellow in Chemistry.

C. Fixation of Nitrogen by Bokhara Clover in Volusia Silt Loam.

Arthur Jackson Mix, A.B., Hamilton, 1910; Fellow in Plant Path.

P. Winter Injury. I. The Nature of Frost Injury.

Frank Masanao Mizushi, B.S., Calif., 1914.

C. An Analytical and Graphical Solution for Non-Sinusoidal Alternating Currents.

Charles Moon, B.S., C.E., West Virginia, 1910; Scholar in Physics.

I. Study of Silicon Detector for Electric Waves; Design of a "Buzzer" to serve as a Generator of Oscillations (Elec.) for Laboratory Measurements.

Oliver Ralph Overman, A.B., Indiana, 1910; A.M., Same, 1911; Assistant in Chemistry.

P. The Effect of Addition Substances in Lead Plating Baths. I. The Oxidation of Hydrazine.

Chi Ping, B.S., Cornell, 1913.

C. The Round Golden Rod Gall and Its Insect Inhabitants.

Byron Saunders Proper, B.Chem., Cornell, Feb. 1915.

C. A Study of the Artesian Wells at Freeville, N. Y., with respects to their Mineral Constituents and Bacterial Flora (Thesis).
Clifford Coutant Rose, B.Chem., Cornell, 1912; Assistant in Chem.

C. Dinitro-and Tetranitro-phenol-tetrachloro-phthaleins and the Nitro-Derivatives of Tetrachlorofluoran.
Ernest Rice Smith, A.B., Oberlin, 1912; Scholar in Geology.

I. Investigation of East Coast Quaternary Mollusca and Stratigraphy.
Carl Waldemar Strauss, B.S., Cornell, 1914.

I. The Effect of Certain Commercial Fertilizers on Growth of Red Pine and White Pine Seedlings (Thesis).
Paul Thorne Weeks, A.B., Oberlin, 1913; Instructor in Physics.

P. Some Secondary Effects from Roentgen Rays. I. The Energy of Roentgen Rays.
William Roy Wigley, M.E., Cornell, 1907.

P. Fatigue of Steel (Thesis).
William Colcord Woods, B.A., Wesleyan, 1913; Assistant in Biology.

P. A Note on Rhagoletis in Blueberries. I. The Insects of the Blueberry; Metamorphosis of a Chrysomelid Beetle.

MEMBERS OF THE CLASS OF 1915

Edward Arthur Batley.

I. Aging Effect on Friction Head in Pipes due to Tuberculation.
Errol Weber Doebler.

C. Flow over Proportional Weirs. I. An Experimental Study of the Flow over V Notches with Different Vertex Angles and Wide Range of Heads.
Estella Catherine Fisher.

I. A property of Substitution Groups Analogous to Multiple Transitivity.
David Fishkind.

I. The Preparation and Properties of Chlorazide.
Harold Wheelock Fletcher.

I. Re-design, Construction and Tests of a Two Cycle Diesel Engine.
Frederick Raymond Georgia, Assistant in Chemistry.

C. The Determination of Minute Amounts of Arsenic in Food and Household Articles.
Edgar Blauvelt Johnson.

I. The Preparation and Properties of Hydrogen Selenide.
Ismond Ellis Knapp, Assistant in Chemistry.

I. A New Method for the Determination of Mercury.
Clarence Netzen, Assistant in Chemistry.

C. Potash and Aluminum from Feldspar.
John Edward Pennywitt.

I. Aging Effect on Friction Head in Pipes due to Tuberculation.
Peter Theodore Peterson, Assistant Veterinary College.
Raymond Van Voorhis Puff.

I. The Effect of Peptone Concentrations upon Bacterial Counts on Gelatine in Water Analysis.
Frederick Harvey Rayfield.

C. Flow over Proportional Weirs. I. The Flow over V Notches with Different Vertex Angles and Wide Range of Heads.
Herbert Ridgway.

I. Reinforced-Concrete Design in Railroad Track Elevation.
James Fremont Shigley, B.Pd., Michigan St. Normal College, 1912; Assistant Veterinary College.

I. Differentiation of Organisms Causing Otitis Media.
Oliver Reger Wilkinson.
Alan Frank Williams.

I. Study of the Economy of Installing a Plant for Storing and Handling Coal.

ALUMNI

John Robert Haswell, C.E., Cornell, 1909.

P. Land Drainage in Maryland; Engineering for Land Drainage, and other publications.

John Clayton Hoyt, C.E., Cornell, 1897.

P. River Discharge (collaborator); Comparison between Rain Fall and Run-off in the U. S., and other publications.

John Stolker Longwell, B.S., C.E., Highland Park, 1907; A.B., Same, 1908; C. E., Cornell, 1910.

P. Experiments on Weir Discharge.

William Dye Mount, M.E. Cornell, 1890.

C. (Numerous researches and investigations in Power Development and Soda Making).

Edward Herman Thomson, B.S. in Agr., Cornell, 1909; M.S.A., Same, 1911.

P. Profits that Farmers Receive; The Survey Method of Determining Cost of Production, etc.

SPECIAL

Walter Buddin, B.A., Cambridge, 1910; Visiting Investigator in Soil Technology.

P. Partial Sterilization of Soil by Volatile and Non-volatile Antiseptics; Note on the Increased Nitrate Content of a Soil subjected to Temporary Drying in the Laboratory.

Paul A. Murphy, B.A., Dublin, 1912; Visiting Investigator in Plant Pathology.

P. Black Stalk Rot, a Bacterial Disease of the Potato; The Oospores of Phytophthora Infestans. C. The Morphology and Cytology of the Sexual Organs in Phytophthora Erythroseptica.

F. K. RICHTMYER, *Recording Secretary.*

THE ILLINOIS CHAPTER

Since the report of the Illinois Chapter published in the QUARTERLY, six meetings were held in 1913-14. The list of meetings with speakers and dates is as follows:

The Prairie Style of Art with Special Reference to Landscape Gardening, Professor Wilhelm Miller. Open meeting, January 21.

Discussion on Possible Improvements of Research Conditions, February 18.

Some Western Fuel Problems, Professor S. W. Parr. Open joint meeting with the University of Illinois Section of the American Chemical Society, March 18.

Spiders and Their Spinning Work, Professor A. D. MacGillivary, April 15.

Short Reports on Research in the College of Engineering, Dean Richards, Professor Schmidt, Mr. Yensen and Professor Moore. Election of members, May 6.

Initiation. Address on Ideals Relating to Scientific Research by President G. A. Miller. May 20.

The following persons were initiated:

FROM THE FACULTY

Stephen Osgood Andros, A.B., Bowdoin College, 1897; B.S. and E.M., Michigan College of Mines, 1903; Instructor in Placer Mining, University of Pittsburgh; Associate in Mining Engineering and Mining Engineer for Coöperative Mines Investigation.

Published: Coal Mining Practice in District No. 8; Articles in technical magazines; manuscript for seven other bulletins in press.

Harold Houghton Dunn, B.S. 1908, University of Illinois; John Deere Plow Co., Moline, Ill.; Test Department of the Midland Motor Co., Moline. Ill.; Assistant in Railway Engineering in the Engineering Experiment Station.

Ready for publication: Tractive Resistance of a 28-ton Electric Car. To be published as a Bulletin of the Engineering Experiment Station.

Virgil R. Fleming, B.S. University of Illinois, 1905; Testing Engineer with U. S. G. S. Structural Materials Laboratory, St. Louis, Mo., 1906-07; Associate in Theoretical and Applied Mechanics, University of Illinois.

Published: Fire Streams from Small Hose and Nozzles, Illinois Water Supply Association, 1913.

Louis Allen Harding, B.S., M.E., Pennsylvania State College, 1899, 1902; Professor and Head of Department of Mechanical Engineering, Pennsylvania State College, 1909-12; Consulting Engineer, New York City, 1912-13; Professor of Experimental Mechanical Engineering.

Published: Bituminous Coal Washing Plant, Mines and Minerals, 1905; Design of Hot Blast Heating Apparatus for Shop and Foundry Buildings, Pennsylvania State College Bulletin, 1910; The Design of Air Ducts, Heating and Ventilating Magazine, 1913.

Elmer Allen Holbrock, B.S. in Mining Engineering, Massachusetts Institute of Technology, 1904; Professor of Mining Engineering and Metallurgy, Nova Scotia Technical College, Halifax, N. S.; Assistant Professor of Mining Engineering, University of Illinois.

Published: Modern Gold Mining Conditions Applied to Nova Scotia; Work of the U. S. Bureau of Mines; Calorific Value of N. S. Coals; Efficiency Engineering Explained, Nova Scotia Mining Society.

Wilfred Francis Langelier, B.S. in Chemistry, New Hampshire State College, 1909; M.S. University of Illinois, 1911; Chemist State Water Survey, 1909-11; Inspector, State Water Survey, 1911-date.

Published: The Bromates of the Rare Earths. Part II. The Bromates of the Cerium Group and Yttrium. J. Am. Chem. Soc.,

31, 913-17. Composition of Sediment Found in Water from Drift Wells, University of Illinois, Series No. 9, 107-13. Official Report of Test of Filter Plant at Evansville, Ind.; Sanitary Survey of Vermilion River, Bull. No. 9, 136-46.

Otto Rahn, Ph.D., University of Göttingen, 1902; Assistant Professor of Bacteriology and Hygiene, Michigan Agricultural College; Assistant Professor Bacteriology, University of Illinois.

Published: Inaug-Dissertation: Über ein Neues Terpineol vom Schmelzpunkt 32°, Göttingen; Die Empfindlickeit der Faulnis und Milchsäure bacterien gegen Gifte, Cent. f. Bak. II Abt. 14:21-25, 1905; Die Reifung des Harzkäses, Echkles & Rahn, Cent. f. Bak. II Abt. 14:676-680, 1905; Many other papers.

Fred B. Seeley, B.S., Worcester Polytechnic Institute, 1907; with Columbia Steel Co., Reading, Pa.; Instructor of Mechanics, Villa Nova College; Instructor in Theoretical and Applied Mechanics, University of Illinois, 1909.

Published: The Mechanics of the Gyroscope, Technograph, January, 1914; Vents on Steel Pipe Lines (joint author, M. L. Enger), *Engineering Record,* May 2, 1914.

Frank Lincoln Stevens, B.L., Hobart, 1891; B.S., Rutgers, 1893; M.S., Rutgers, 1897; Ph.D., Chicago, 1900; Professor of Botany, North Carolina; Dean Agricultural College, Porto Rico; Professor of Plant Pathology, University of Illinois.

Published: Numerous important papers more especially in Plant Pathology. Author of several books on fungi that cause plant diseases.

John N. Vedder, A.B., Union College, 1895; A.M., Columbia, 1903; Special Honors in Mathematics and Physics; Racquette River Power Co.; Am. Locomotive Works; Assistant in Engineering Experiment Station.

Ready for publication: Research on the reheating of compressed air and on air steam mixtures, to be published as a Bulletin of the Engineering Experiment Station.

Ruth Wheeler, A.B., Vassar, 1899; Ph.D., Yale, 1913; Graduate Student at Cornell and Chicago; In Charge of Chemistry, Department of Domestic Science, Pratt Institute; Associate in Household Science, University of Illinois.

Published: Feeding Experiments with Mice, J. Exp. Zoölogy Vol. 15, 209-223, 1913; The Nutritive Value of Some Commercial

Infant Foods (with A. Biester), Amer. Jour. of the Diseases of Children, March, 1914.

Wilbur M. Wilson, B.M.E., Iowa State College, 1900; M.M.E., Cornell University, 1904; Instructor in Mechanical Engineering, Iowa State College, 1901-03; Assistant Professor of Mechanical Engineering, Iowa State College, 1904-1907; Associate Professor of Mechanical Engineering, Iowa State College, 1907-08; Structural Detailer Illinois Steel Co., 1909-11; Structural Designer and Estimator, Illinois Steel Co., 1911-12; Designer, Strauss Bascule Bridge Co.; Assistant Professor of Structural Engineering, University of Illinois, 1913-date.

Published: Descriptions of Spur Gears, Am. Mach., V. 28; Efficiency Tests of Rough Gray-Iron Spur Gears, Am. Mach., V. 28; Analysis of Stresses in Guy Wires, Jour. West. Soc. of Eng., January, 1914; Cost of Power Generated by Different Types of Steam Engines, *Power,* January, 1907.

Lewis Emanuel Young, B.S. in Mining Engineering, Pennsylvania State College, 1900; E.M., Iowa State College, 1904; Director, Missouri School of Mines; Instructor, Mining Engineering, University of Illinois and Graduate Student in Economics.

Published: Technical papers for the mining press; Report on Monroe County, Iowa, Iowa Geological Survey (with S. W. Beyer).

From the Graduates

Mikishi Abe, B.S., Kogaku Tokugyoshi, Japan, 1905; Assistant Engineer on Construction Work, Imperial Railways of Japan; Candidate for Ph.D. in Theoretical and Applied Mechanics.

Thesis: Statically Indeterminate Stresses in Rigidly Connected Structures of Reinforced Concrete.

Jesse LeRoy Conel, A.B., James Millikin, 1912; A.M., University of Illinois, 1913; Fellow in Zoölogy.

Published: Paper on Sclerotinia; A Study of the Nissl Bodies as a Test of Nerve Cells (with Professor Carpenter).

Stanley B. Fracker, A.B., Buena Vista, 1910; M.S., Iowa State College, 1912; Candidate for Ph.D., University of Illinois, 1914; Assistant, University of Michigan; Assistant, Iowa State College; Fellow in Entomology, University of Illinois.

Published: A Systematic Outline of the Reduviidae of North America. Proc. Iowa Acad, Sci., 1913; New Characters in the Classification of Microlepidopterous Larvæ, Atlanta Meeting of the Entomological Society of America. Ready for publication:

Numerical Data as a Basis for the Determination of Species in Nematodes (Cobb's formula).

Philip Garman, B.S., 1913, Kentucky State University; M.S., University of Illinois, 1914; Scholar in Entomology.

Thesis: Studies on the Fungous Parasites of Injurious Insects. The Classification of the Nymphs of the Zegoptera, a Suborder of Odonata.

Clarence Mark Hebbert, B.S., Otterbein University, 1911; Assistant in Mathematics.

To be published: The Projective and Kinematic Geometry of Closed Polygons.

George W. Heitcamp, A.B., University of Wisconsin, 1912; Candidate for M.S., University of Illinois, 1914; Assistant in Geology, University of Illinois.

Thesis: Origin and Distribution of the Loess-like Material in the Vicinity of Urbana, Illinois.

Rudolph McDermett, B.S. in Electrical Engineering, University of Illinois, 1912; Candidate for M.S. in Electrical Engineering, University of Illinois, 1914.

Thesis: Thermal and Metallographic Properties of Pure Iron.

Harold H. McGregor, A.B., McMaster University, 1910; M.S., University of Louisville, 1912; Graduate Student, University of Illinois.

Thesis: Proteins of the Central Nervous System.

George Alfred Maney, B.S., University of Minnesota, 1911; Research Fellow Engineering Experimental Station; Candidate for M.S., University of Illinois, 1914.

Thesis: Cantilever Flat Slabs of Reinforced Concrete. Ready for publication: A New Method for Computing Stresses in Curved Beams.

Lewis Clark Mathewson, A.B., A.M., Albion, 1910, 1911; A.M., University of Illinois, 1912; Fellow in Mathematics; Candidate for Ph.D., University of Illinois, 1914.

Thesis will be published.

Karr Parker, B.S., Carthage College, 1913; Graduate Student in Chemistry, University of Illinois.

Research: The E. M. F. of Certain Alkali Halide Concentration Cells; A Study of the Apparatus Employed in Measuring the Conductance of Electrolytes.

Newton L. Partridge, B.S., University of Illinois, 1913; Scholar in Entomology; Candidate for M.S., University of Illinois, 1914.

Published: The Tracheation of the Pupal Wings of Some Saturnians. Proceedings of the Cleveland Meeting of the Entomological Society of America.

Thesis: The Tracheation of the Wings of the Lepidoptera.

Oscar Alan Randolph, B.S., Missouri School of Mines, 1911; M.S., University of Illinois, 1913; Student Assistant in Chemistry, Missouri School of Mines, 1910-11; Assistant in Physics, University of Illinois.

Research: An Investigation of the Dielectric Constant of Water at Liquid Air Temperatures.

Earl Woodhull Sheets, B.S. in Agriculture, West Virginia University, 1912; Member Summer School Faculty, West Virginia University, 1912; Assistant in Agriculture, West Virginia; Graduate Student, University of Illinois; Candidate for M.S. in Agriculture.

Thesis: Production of Lambs for Special Market.

Walter Andrew Shewhart, A.B., University of Illinois, 1913; Scholar in Physics; Candidate for M.S. in Physics, University of Illinois.

Thesis: A Study of the Reflection, Propagation and Diffraction of Ripple Waves.

Orrin H. Smith, A.B., Knox College, 1908; A.M., University of Illinois, 1909; Teacher of Physics in Champaign, Ill., High School; Candidate for Ph.D.

Published: Photographing Retrograde Rays, Paper before the American Physical Society at Washington, D. C., April, 1914.

Fred Wilbur Tanner, B.S., Wesleyan University, 1912; Assistant Bacteriologist, State Water Survey, 1912-date; Candidate for M.S. Degree, University of Illinois, 1914.

Research: Bacteria in Deep Wells and Surface Waters.

Howard Rice Thomas, C.E., University of Texas, 1912; Railway Location work in Texas; Research Fellow, Engineering Experiment Station; Candidate for M.S. in Theoretical and Applied Mechanics.

Thesis on Reinforced Concrete Columns. Published: Stress Analysis Test of the Soo Terminal, *Technograph,* 1914.

Ying H. Tsou, B.S., Cornell, 1912; M.S., University of Illinois, 1913; Graduate Student in Entomology.

Published: The Homology of the Body Setæ of Lepidopterous Larvæ. Abstract. Presented with Mr. S. B. Fracker at Cleveland Meeting of Entomological Society of America.

Thesis: The Classification of Noctuid Larvæ.

Harry Dwight Waggoner, B.A., A.M., University of Illinois, 1909, 1914; Teacher of Nature Study, Normal, Illinois; Teacher of Biology, Normal, Illinois; Student Assistant in Botany, University of Illinois.

Research: The Effect of Supra-maximal Temperature on Dry and Moist Seeds.

Earle H. Warner, A.B., University of Denver; M.A., University of Illinois, 1914; Instructor in Physics in Preparatory Department, University of Denver; Assistant in Physics, University of Illinois, 1912.

Research: Investigations on the Dielectric Constants by the High Frequency Methods.

Herman Carl Wolf, B.S. in Electrical Engineering, University of Illinois, 1913; Graduate Student in Electrical Engineering; Candidate for M.S., 1914.

Thesis: (Undergraduate) Study of Dielectric Strength of Air; (Graduate) Discharge of High Potentials.

William Wodin Yapp, B.S. in Agriculture, University of Illinois, 1911; Illinois State Soil Survey, Assistant in Department of Dairy Husbandry, University of Illinois; Candidate for M.S., 1914.

Thesis: The Reliability of the Short Time Official Test as an Indication of the Ability of Holstein-Friesian Cows to Produce for Yearly Periods.

From the Undergraduates

The following members were elected because of the promise they have given by the quality of their work to do noteworthy work in science:

William A. Albrecht, B.A. 1911 (Agr.)
John Henning Anderson (C. E.)
Walter Sigfried Anderson (C. E.)
Howard Clinton Arnold (Ceramics)
Lincoln Bales Breedlove (M. E.)
Ethel Clarke (Household Science)
Edward A. Doisey (Med.)
Hubert M. English (Med.)
Ora French Foster (Agr.)
Roy Hansen (Agr.)

Frank Allen Kirkpatrick (Ceramics)
George Meyer, Jr. (M. E.)
Gundayu Mizoguchi (E. E.)
Raymond William Owens (E. E.)
Katherine Planck (H. Sci.)
Anton Prasil (Chem. E.)
Paul C. Rich (Chem.)
Helen M. Richards (Sci.)
David Morris Riff (C. E.)
Jules Henry Robert (M. E.)
Frank T. Sheets (M. and S. E.)
Harry Raymond Tear (E. E.)
Melvin Thomas (Agr.)
Charles Henry Thompson (C. E.)

During the year 1914-1915 seven meetings have been held at which papers were read. Two of these were open meetings. The plan of having an annual banquet was inaugurated. For a number of years Sigma Xi and Phi Beta Kappa have held a joint meeting during Commencement week, the speaker being chosen alternately by the societies. Because of the many activities during this week the attendance at the joint meetings has always been disappointing. This year, therefore, the joint meeting was held May 4, the date of the initiation of new members. The address was delivered before a large audience by George Otis Smith, Director of the U. S. Geological Survey, and was followed by a reception to Phi Beta Kappa.

A committee consisting of twelve members was appointed by the society "to aid in the dissemination of accurate information concerning research at the University". Members of the committee have supplied the *Illini* with about a column a week relating to the research work of the various departments of the University. Another committee of the society is considering methods of training undergraduates in research methods.

In the papers presented this year especial emphasis has been placed on research methods. The list of meetings with speakers and dates is as follows:

The Prediction of Oil Fields in Illinois, Mr. F. H. Kay; The Means Employed in Establishing the Alexandrian Series in the Silurian of the Mississippi Valley, Professor T. E. Savage, October 28.

The Harmful Effect of Ultra-Violet Radiation on the Lens of the Eye, and, The Protection of the Animal Organism Against Self-Digestion, Professor W. E. Burge, November 18.

First Annual Dinner, December 16.

The Eruption of Lassen Peak in California, Dr. Diller (read by Professor W. S. Bayley); Discussion of the Recent Earthquake in Italy, Dr. J. L. Rich, open meeting, January 28.

The Origin of Mammals, Professor John S. Kingsley, February 24.

Curves and Some of Their Properties, Dr. Arnold Emch; Electric Photometry of Stars, Dr. Joel Stebbins and Dr. Jakob Kunz, March 24.

Some Experiments Illustrating Recent Discoveries in Physics, Dr. Chas. T. Knipp; open meeting, preceded by business meeting and the election of new members, April 14.

Annual Initiation. Annual address before Sigma Xi and Phi Beta Kappa: Practical Ideals, George Otis Smith, May 4.

The following persons were elected to membership:

FACULTY

James Hartley Beal, A.B., Scio College, 1884; LL.B., Cincinnati Law School, 1886; Ph.G., Ohio Medical University, 1894; Honorary: Sc.D., Mt. Union College; Pharm.M., Philadelphia College of Pharmacy; Pharm.D., University of Pittsburgh; President Scio College, 1902-04; Dean Scio College of Pharmacy, 1887-1908; Visiting Professor Theory and Practice of Pharmacy, University of Pittsburgh, 1903-1911; Editor *Midland Druggist,* 1908-1911; Editor *Journal Am. Pharm. Assoc.,* 1911-14; Director Pharm. Research Fund.

Published: Standard Textbook of Pharmacy, 5 vol.; Chemical Arithmetic; Pharmaceutical Interrogations; Pharmaceutical Laboratory Manual; Interrogations in Dental Metallurgy; Practical Pharmacy and Dispensing; and many articles in Pharmaceutical Journals.

Ralph Kent Hursh, B.S. in M. E., University of Illinois, 1908; Graduate work in Ceramics, University of Illinois; Special work at Carnegie Technical School; U. S. Geological Survey and U. S. Bureau of Standards as Junior Ceramic Chemist; Instructor in Ceramics, University of Illinois.

Published: Note on the Dissociation of Calcium Hydrate, and Note on the Relation of Preheating Temperature to Volume Shrinkage, T. A. C. S., Vol. 14, and Ceramic Department Bulletin No. 17, University of Illinois; Note on Estrick Plaster, T. A. C. S., Vol. 17.

John Russell Malloch, Baccalaureate degree from Glasgow University, Scotland; Expert U. S. Bureau of Entomology at U. S.

National Museum; Illustrator and Custodian State Entomologist's Office, University of Illinois.

Published: New American Dipterous Insects of the Family Pipunculidæ, Proc. U. S. Nat. Mus., Vol. 43, 1912; The Genera of Flies in the Subfamily Botanobiinæ with Hind Tibial Spur, Proc. U. S. Nat. Mus., Vol. 46, 1913; The Chironomidæ or Midges of Illinois, Bull. Ill. State Lab. Nat. Hist., Vol. 10, Art. 6, 1915; and many papers on the Diptera of Europe, America and other parts of the world.

Barney S. Radcliffe, A.B., Miami, 1908; M.S., University of Illinois, 1910; Chemist Assistant Superintendent, Denny-Renton Clay and Coal Company, 1910-12; Instructor in Ceramics.

Published: Opalescence and the Function of Boric Acid in the Glaze (with R. T. Stull), Vol. 12, T. A. C. S., University of Illinois Bulletin No. 14; Investigations of the Dia-Electric Strength of Some Porcelains, Vol. 14, T. A. C. S., University of Illinois Bulletin No. 16; Influence of Chlorides of Calcium and Iron when Precipitated in a Porcelain Body, and, Some Cobalt Uranium Colors, Vol. 16, T. A. C. S., and University of Illinois Bulletin No. 22; Chrome-Tin Red Glazes between Seger Cones 2 and 8, Vol. 17, T. A. C. S.

Arthur E. Williams, B.S. in Ceramics, University of Illinois, 1910; Graduate work; Superintendent Western Brick Co., Factory No. 2; Instructor.

Published: Investigation on Iron Ore Cement, Bulletin No. 19, University of Illinois, and in Vol. 8, T. A. C. S., National Association of Cement Users; Notes on the Development of the Ruby Color in Glass, Vol. 15, T. A. C. S., and Bulletin No. 23, Ceramics Department, University of Illinois.

Arthur Cutts Willard, S.B., Mass. Inst. of Tech., 1904; Heating and Sanitary Engineer, U. S. War Department; Assistant Professor of Heating and Ventilation.

Published: Heat Transmission Tests on Steel Mail Car Section, *Railway Age Gazette,* June 26, 1914; General Specifications for Coal for Army Stations in the U. S. A. War Department Circular, March, 1912; Engineering Data for Furnace Heating Design, based on Tests of Complete Equipment.

GRADUATE STUDENTS

Albert John Becker, B. S., University of Michigan, 1903; M.E., University of Michigan, 1907; Professor of Applied Mathe-

matics, University of North Dakota; Candidate for Ph.D. in Theoretical and Applied Mechanics.

Thesis on Strength and Stiffness of Material under Bi-axial Stress. " . . . . . from his tests he has apparently been successful in discovering a modification of Guest's Law and in showing from a careful study of former test data as well as from his own that the 'maximum shear theory' has limitations".

St. Elmo Brady, B.A., Fisk University, 1908; M.A., University of Illinois, 1914; Head of Science Division, Tuskegee Institute, Ala., 1908-13; Fellow in Chemistry, University of Illinois.

Ready for publication: Ionization of Keto-Paraffine Acids.

Ernest Edward Charlton, B.A., Grinnell College, 1913; Candidate for M.S.; Graduate Assistant in Chemistry, University of Illinois, 1913-14; Assistant in Chemistry, University of Illinois, 1914-15.

Thesis: The Quantitative Extraction of Coal with Phenol, and the Determination of Organic Sulfur in Coal. (To be published.)

Margaret Vara Cobb, A.B., Radcliffe, 1910; A.M., Illinois, 1913; Assistant in Zoölogy, University of Illinois, 1913-14; Assistant in Education, University of Illinois, 1914-15.

To be published: Method for Measuring Family Likeness in Arithmetical Abilities; Freshwater Nematodes of the Douglas Lake Region (joint author), Trans. Am. Micr. Soc., 1915; Note on Identical Twins, Science, 1915.

Oscar E. Harder, A.B., University of Oklahoma, 1910; A.M., 1911; Candidate for Ph.D., University of Illinois, 1915, Major: Industrial Chemistry; Instructor in Chemistry and Laboratory Clerk, University of Oklahoma; Instructor, Summer Session, 1910-1911; Food Analyst of Kansas State Board of Health, with rank of Assistant Professor, University of Kansas, 1911-13; In charge of laboratory, February-September, 1913; Fellow in Chemistry, University of Illinois, September, 1913, to date.

Published: Laboratory Manual of Chemistry, two pamphlets (joint author with G. Y. Williams); Note on the Standard Vanillin Solution for the Colorimetric Method for the Determination of Vanillin in Flavoring Extracts, Jour. Ind. and Eng. Chem. 5, No. 7, July, 1913. Several reports on work done in Kansas State Food Laboratory published in Bulletin of the State Board of Health of

Kansas, 1912 and 1913; Thesis for Ph.D.: A Study of the Alloy System, Nickel, Copper and Chromium.

Harry V. Heimburger, A.B., University of Illinois, 1911; Candidate for A.M., 1915; Assistant in Zoölogy, September, 1913.

To be published: A Study of the Earthworms of Indiana, together with a Description of New Species.

Raymond W. Hess, A.B., Morningside College, 1912; A.M., University of Illinois, 1914; Graduate Assistant, University of Illinois, 1912-13; Assistant in Chemistry, 1913.

To be published: The Characterization of Mono and Di-Gamma-Cyano-propylmalonic Diethylesters and Acids; The Ionization Constant of Delta-Acetylvaleric Acid.

Joseph Whitney Howard, A.B., Shurtleff College, 1912; A.M., University of Illinois, 1913; Fellow in Chemistry.

To be published: A Quantitative Study of the Hoffmann Rearrangement of N-Alkylanilines and the Mechanism of the Reaction.

Thomas Ernest Layng, A.B., 1909, A.M., 1912, McMaster University; Candidate for Ph.D., University of Illinois, 1915; Instructor in Chemistry and Physics, Woodstock College, 1909-11; Graduate Assistant in Chemistry, University of Illinois, 1912-13; Assistant in Chemistry, first semester, 1913-14; Special Research Assistant, Engineering Experiment Station, second semester, 1913-14; Fellow in Applied Chemistry, Engineering Experiment Station, University of Illinois, 1914.

Thesis: Distillation of Coal at Low Temperature and a Study of Resulting Products. Will probably be published.

Ralph Harlan Linkins, A.B., Illinois College, 1911; A.M., University of Illinois, 1914; Assistant in Zoölogy, University of Illinois.

Ready for publication: On Some Echinorhynchi from North America Fresh-Water Fishes, Illustrated.

Fred Weaver Muncie, A.B., Wabash, 1910; M.S., University of Illinois, 1913; Assistant in Chemistry in Agronomy, Agricultural Experiment Station; First Assistant in Foral Chemistry, Experiment Station, University of Illinois; Candidate for Ph.D.

Thesis: The Physiological Effects of Excessive Applications of Potassium Sulphate on Carnations. To be published.

Merle Louis Nebel, B.S. in Mining Engineering, 1913, University of Illinois; Candidate for the M.S. degree, 1915; Field Investigator for the Coal Mining Investigations; Fellow in the Engineering Experiment Station, University of Illinois.

To be published: The Specific Gravity of Coal, as a Bulletin of the Engineering Experiment Station.

Alma Jessie Neill, A.B., 1913, A.M., 1915, University of Illinois; Assistant in Physiology, University of Illinois.

Ready for publication: Production of Cataract.

Rosalie Mary Parr, A.B., A.M., 1906, 1913, University of Illinois; Graduate Student and Assistant in Botany.

To be published: The Response of Bilobolus to Light.

Clarence Samuel Ross, A.B., 1913, University of Illinois; Assistant in Geology, 1913; Candidate for M.S. degree, 1915.

To be published: The Stratigraphic Position of the Bed of Iron Ore in Eastern Wisconsin (joint author with T. E. Savage).

Horace Wesley Stunkard, B.S., 1912, Coe College; A.M., 1914, University of Illinois; Graduate Assistant in Zoölogy; Fellow in Zoölogy.

To be published: Revision of Genus Telorchis, including a Description of Several New Species, Illustrated. Work on the Parasites of North American Turtles well advanced.

Minnie Elizabeth Watson, A. B., 1909, Olivet College; M. S., 1913, University of Illinois; Candidate for the Ph.D. degree, 1915; Graduate Assistant in Zoölogy; Fellow in Zoölogy, University of Illinois.

To be published: Studies on Eugregarine of U. S. A., including Observations on Their Biology, Structure, and Taxonomy, Illustrated. Has ready also manuscript revision Labbé on Gregarinida in Das Tierrich.

Lars A. Welo, B.S., 1911, North Dakota Agricultural College; Graduate Student University of California, 1912-13; Graduate Student, University of Illinois, 1914-15.

To be published: A New Method of Determining the Horizontal Component of the Earth's Magnetism; Characteristics of the Wehnelt Cathode.

Harold Malcolm Westergaard, B.S. in Civil Engineering, 1911, Royal Technical College of Copenhagen, Denmark; Engineer in reinforced concrete work in Copenhagen, Hamburg and London; Student at Göttingen and Munich; Fellow of the Ameri-

can Scandinavian Foundation; Graduate Student, University of Illinois, 1914-15.

Published: Statisk Fejlujævning, Nyt Tidsskrift for Mathematik, 1910 B; Konstructioner uden Lineal, Nyt Tidsskrift for Mathematik, 1906 A. Not published: Die Elastische Fehlertheorie und ihre Technischer Anwendungen, Thesis submitted at Munich.

UNDERGRADUATES

Everett R. Brunskill, Candidate for B.S. in Chemical Engineering; Assistant in Chemistry, University of Illinois.

Research: p-Chlorobenzoylacetic Ether and Its Derivatives.

William Herald Chambers, Candidate for B.S. in Agriculture.

Ralph Green, Candidate for B.S. in Civil Engineering.

Thesis: The Lateral Pressure of Wet Concrete on Column Forms.

Sydney Marion Hull, Candidate for B.S. in Chemistry; Student Assistant in Chemistry.

Thesis: Analysis of Nickel, Copper, Chromium Alloys by Electrolytic Means.

Lewis Thornton Lyman, Candidate for B.S. in Agriculture.

Research: Studies of Soil Protozoa; Enzymic Hydrolysis of Seed Coats.

Agnes Mabel Milne, Candidate for B.S. in Household Science.

Forrest Hamilton Murray, Candidate for A.B., Major in Mathematics.

Thesis: Groups and Domains of Rationality.

Peter Jacob Nilsen, Candidate for B.S. in Electrical Engineering.

Thesis: Development of a New Electric Power Measuring Device.

Roe Niver, Candidate for A.B.; Assistant on the force of the State Entomologist.

Thesis: The Clover Root Borer.

Maynard Elmer Slater, Candidate for B.S. in Agriculture.

To be published: Quantitative Determination of the Amino-acids of the Mixed Proteins of the Feeding Stuffs (joint author with H. S. Grindley and W. E. Joseph).

Perry Jerome Sweeny, Candidate for B.S. in Electrical Engineering.

Thesis: Endurance Tests of Primary Electric Cells.

George William Watts, Candidate for B.S. in Mechanical Engineering.

Thesis: Strength of Oxy-acetylene Welds in Cast-iron and Steel.

Edward Allen Williford, Candidate for B.S. in Electrical Engineering.

Thesis: Endurance Tests of Primary Electric Cells.

Clyde Charles Younglove, Candidate for B.S. in Architectural Engineering.

M. L. ENGER, *Recording Secretary.*

THE MICHIGAN CHAPTER

The last regular meeting of the Michigan Chapter was held at the Michigan Union, Thursday evening, May 27, 1915. The principal address of the evening, which followed the annual dinner at which eighty-eight members were present, was delivered by Dean Victor C. Vaughan of the Medical Department on Typhus Fever. Following the address forty-three new members were initiated into the society. Of this number seven were chosen from the faculty, eighteen from among the resident graduates, and eighteen from the various undergraduate departments. The undergraduate elections were largely from the College of Engineering. This department was represented by sixteen out of the eighteen undergraduates elected, while the literary and medical departments furnished one undergraduate each.

Initiates

FROM THE FACULTY

Airey, John, B.S.; Instructor in Engineering Mechanics; Associateship of Royal College of Science, London, 1908; Diploma of the Imperial College of Science and Technology, London, 1910; B.Sc. London University, 1910.

Research: Multiple Operation of Machines, Amer. Machinist, Sept. 23, 1911; Machine Spindle Speed Series, Amer. Machinist, Dec. 9, 1911; Forced Vibrations Critical Speeds, Michigan Technic, Jan. 1913. Notes on the Pitot Tube, Eng. News, April 27, July 31, 1913; The Gyroscope—Its Principles and Applications in Practice, Amer. Machinist, April 9, 1914; Engineering Aspects of the Gyroscope with Special Reference to Stabilizing Problems, Mich. Technic, May 1914.

Beifeld, Albert Henry, A.B., M.D., Instructor in Pediatrics; A.B. Harvard University, 1903; M.D., Johns Hopkins, 1907; Assistant in Pediatrics, Northwestern University Medical School, 1913-14; Instructor in Pediatrics, Univ. of Michigan, 1914-15.

Research: Ueber d. Wirkung der Nahrungskomponenten der Frauenmilch auf die Darmflora des Säuglings, Jahrb. f. Kinderheilknude, vol. 72, p. 71; Relation of Tonsils and Heart disease, Inter-

state Medical Jour. 1913; The Care of the Infant in the General Hospital, The Modern Hospital, 1913.

Seeley, Ward Francis, A.B., M.D., Instructor in Obstetrics; A.B. Univ. of Michigan, 1909; M.D., Univ. of Michigan, 1911; Instructor in Gynecology and Obstetrics, Univ. of Michigan, 1912-15.

Research: A Case of Cephalhematoma, Physician and Surgeon, Oct. 1912; Two Cases of Acidosis, One with Autopsy, Physician and Surgeon, Nov. 1911; A Case of Hydramnios and Twin Pregnacy, A Case of Abdominal Cesarian Section for an Obliquely Contracted Pelvis, J. Mich. State Med. Soc., March 1914; Pituitrin in Obstetrics with an Analysis of Forty Cases, J. of Mich. Med. Soc., July 1914; A Case of Tumor of the Kidney Mistaken for Ovarian Cyst, J. of Mich. State Med. Soc., July 1915; The Use of Heat in the Treatment of Inoperable Cancer of the Uterus, a Study of Forty-five Cases (not yet published).

Senear, Francis Eugene, B.S., M.D., Instructor in Dermatology; B.S., Univ. of Michigan, 1912; M.D., Univ. of Michigan, 1914.

Research: Case of Thycosis Fungoides, with Histological Study; Chancre of the Cervix Uteri.

Tupper, Walter Wesselhoeft, A.M., Instructor in Botany; A.B., Harvard University, 1910; A.M., Harvard, 1912; Austin Teaching Fellow in Botany at Harvard, 1910-11, 1911-12.

Research: Notes on Ginkgo Biloba, Bot. Gaz., 51, May 1911; Ginkgo Biloba and the Pines (ready for press).

White, Albert Easton, A.B., Assistant Professor in Chemical Engineering; A.B., Brown University, 1907; Supt. of Research Dept., Jones and Laughlin Steel Co., 1909-12.

Research: The Availability of Blast Furnace Slag as a Building Material, Trans. Am. Soc. of Chem. Eng., 1912; An Investigation of Condenser Tubes, printed for private circulation by the Edison Illuminating Co. of Detroit, Mich., 1914; The Pig Iron Industry of Michigan, Mineral Resources, Mich., 1911; The Jones Step Process, Mineral Resources of Mich., 1911.

Williams, Neil Hooker, Ph.D., Assistant Professor of Physics; B.S. in E.E. 1893, M.S. 1895, Ph.D. 1912, all at Univ. of Mich.; Supt. Clinton Elec. Co., 1893-4; Sci. W. Bay City H. S., 1895-97; Prin. do., 1897-98; Instr. Physics and Chem., Central H. S., Detroit, 1898-00; Instr. Physics, Shortridge H. S., Indianapolis, 1900-03; Instr. Physics, Rose Polytechnic Inst., 1903-05; Asst.

Prof. Physics do., 1905-08; Instr. Physics, Univ. Mich., 1908-12; Asst. Prof. do., 1912 to date.

Research: New Apparatus for Demonstration of Boyle's Law, Proceeding Mich. School Master's Club, 1899; Laboratory Manual in Physics, Indianapolis, 1901; The Stability of Residual Magnetism, Physical Review, May 1913; Anomalous Temperature Effects upon Magnetized Steel, Physical Review, Feb. 1914.

RESIDENT GRADUATES

Aldrich, John Abram (Astronomy); Stellar Radial Velocities.

Baits, Stuart Gordon (Electrical Engineer); The Effect of Daylight Glass upon Illumination; A Life Test of Incandescent Lamps; The Glare of Automobile Headlights.

Brigham, Reed Oshea (Botany); Sterilization of Pop Corn, Mich. Acad. Sc., 1915; Relation of Bacteria to the Availability of Soil Nitrogen to Higher Plants.

Christman, Ralph Edward (Chemical Engineer); The Constitution of Chinese Wood Oil.

Delavan, Carlyn Carl (Forestry); Effects of Changes in Temperature and Moisture on Vitality of Oak and Hickory Seed; The Zone of Expansion in Growing Leaves of Forest Trees by Means of Light Prints; Influence of Varying Soil Water Conditions on Different Age Seedlings.

Fahrenwald, Frank Alfred (Chemistry); Tellurium Alloys; A Search for Alloys Suitable for Dental Purposes; Development of a New Process for Treating Zinc Ores; Tungsten and Molybdenum Alloys.

Ferguson, Alfred Lynn (Chemistry); Free Energy of Dilution of Hydrochloric Acid, jointly with R. C. Tolman, J. Am. Chem. Soc., 34, March 1912; Activity and Concentration, Transport Numbers and Boundary Potential, (Thesis for Ph.D.).

Harmon, Watson Gilbert (Civil Engineer); Investigation of the Working of Slate Filters in Sewage Purification.

Honan, Edward Mark (Chemistry); Certain Pyrrole Derivatives.

Hood, Homer Thomas (Chemical Engineer); Gaseous Carbonization of Steel.

Nagler, Floyd August (Civil Engineer); Coefficient of Discharge between Bridge Piers and the Backing up Effect during High Floods.

Peck, Albert Becker (Mineralogy); The Crystallographic and Optical Properties of Nickel Fluoride.

Perkins, Nellie Louise (Psychology); The Value of Distributed Repetitions in Rote Learning, Brit. Jour. of Psych., Vol. 7, Pt. 2, 1914.

Povah, Alfred Hubert William (Botany); Helicostylum and Cunninghamella, Two Genera of the Mucors New to the State, Seventeenth Report Mich. Acad. Sc., 1915.

Ricketts, Allan Townshend (Civil Engineer); Influence of Colloids upon Sewage Purification.

Rufus, Will Carl (Astronomy); The Celestial Planisphere of King Yi Tai-Jo, Trans. Korea Branch of the Royal Asiatic Soc., Vol. 4, Pt. 3, 1913; The Probable Effect of Radioactivity on the Death-Rate of the Sun, Popular Astronomy, Vol. 12, No. 7, 1914.

Rykenboer, Edward A. (Chemistry); Supercooling in Capillary Tubes.

Webb, William (Chemistry); Constitution of the Salts of Acridine.

Undergraduates

LITERARY DEPARTMENT

Shepard, Winnafred Julia (Zoölogy); The Effectiveness of Selection in a Parthenogenetic Insect.

ENGINEERING DEPARTMENT

Allen, Wyeth (Mechanical Engineer); Investigation on Hot Air Furnaces.

Bateman, John Henry (Civil Engineer); Design of a Reinforced Concrete Water Reservoir.

Flook, Norman St. John (Civil Engineer); Study and Analysis of Unit Costs.

Keeler, Karl Fairbanks (Civil Engineer); An Automatic Headgate, Mich. Technic, May 1914; The Keeler Automatic Headgate, Mich. Technic, March 1915.

Kennedy, Chester Clare (Chemical Engineer); Investigation in Organic Chemistry.

Lay, Walter Edwin (Mechanical Engineer); Back Pressures in Automobile Mufflers and their Relation to Horse Power Losses.

McAllister, Ray C. (Mechanical Engineer); Coefficient of Flow of Steam Through Sharp Edged Orifices.

McCabe, Gordon Brown (Electrical Engineer); Electrical Power Plant Construction.

Shackleton, Samuel Paul (Electrical Engineer); Design of a Direct Current Generator.

Shappirio, Solomon (Chemical Engineer); Nature of Sulphur Compounds in Asphalt.

Sleight, Reuben Benjamin (Marine Engineer); Coefficient of Roughness in Kutter's Formula.

Smith, Edward John (Mechanical Engineer); Measurement of High Pressure Air Through Sharp Edged Orifices; Notes on the Experimental Refrigeration Plant Located at the University of Michigan, Mich. Technic, March 1915.

Standerline, Bert Arnold (Chemical Engineer); Crystallization of Silicate Melts.

Tuttle, Wallace Wells (Mechanical Engineer); Horse Power Delivered to the Road to Propel Automobiles at Various Speeds.

Young, Qua-ling (Civil Engineer); Investigation in Railroad Design.

Zumbro, Frank Ralpf (Electrical Engineer); Problems in Transmission of Electricity in Electric Railways.

MEDICAL DEPARTMENT

Sherrick, John Wesley; Paraplegia Dolorosa Terminated by Aplastic Anemia—Anemic Changes in the Spinal Cord, J. Mich. State Med. Soc., Jan. 1915; Volumetric Development of the Brain in Different Aged Human Embryos; Observation on Leutin Reaction (ready for press).

WALTER F. HUNT, *Secretary.*

THE NORTHWESTERN CHAPTER

During the academic year 1914-15 seven regular meetings were held. Five of these each combined a business session and a scientific program, one consisted of a dinner for the members followed by a business session, while another program was purely scientific.

At the regular meetings the following addresses were given by members of the faculty:

Residual Stresses by Dr. O. H. Basquin, Professor of Applied Mechanics.

A Study of Criminalistics by Dr. R. H. Gault, Associate Professor of Psychology.

Heredity in Man from a Biological Standpoint by Dr. S. I. Kornhauser, Assistant Professor of Zoölogy.

The Relation between the Geology, History, and Ethnology of Turquois by Joseph E. Pogue, Associate Professor of Geology.

The Phenomena of Demagnetization of Iron and Steel by Dr. G. G. Becknell, Instructor in Physics.

The Use of Cathode Rays for Making Mirrors by Dr. G. V. McCauley, Instructor in Physics.

At the last meeting of the year an address was given by Dr. H. E. Cowles, Professor of Botany, Chicago University, on The Interrelation of Sand dunes and Plant Life.

The following persons have been elected to active membership by the Northwestern chapter:

FROM THE FACULTY

Dr. S. I. Kornhauser, Assistant Professor of Zoölogy.

A Comparative Study of the Chromosomes in the Spermatogenesis of Euchenopa binoata (Say) and Euchenopa (Campylenchia Stal) curvata (Fabr.). Arch. f. Zellf. Bd. XII.

A Cytological Study of the Semi-parisitic Copepod, Hersilia apodiformis (Phil.) with Some General Considerations of Copepod Chromosomes. Arch. f. Zellf. Bd. XIII.

Henry R. Aldrich, Instructor in Mining and Metallurgy.

Paul M. Batchelder, Instructor in Mathematics.

Graduate Student at Dartmouth, Princeton, and Harvard, pursuing research studies on The Hyter Geometric Difference Equation.

GRADUATE STUDENTS

Henry A. Babcock, Fellow in Physics.

Bachelor's thesis: Specific Heat of Liquid Ammonia (between 0° and 50° — Method of Mixtures).

Master's thesis: A Method of Determining the Variation of Specific Heats of Liquids with Temperature (with Experimental work on Liquid Ammonia between 20° — 100°). These studies are being continued.

John R. Ball, Assistant in Geology.

Floyd Neff, Graduate Student in Geology.

Arthur C. Walton, Assistant in Zoölogy. A Cytological Study of Ascariscanis (Werner).

Frank M. Schertz, Fellow in Botany. Development of Floral Organs in Scrophulariaceae.

SENIORS

J. Frank Ward, Senior in Engineering. A Study of the Water Consumption in Evanston, Illinois.

Henry R. Curme, Senior in Chemistry.

WM. L. WOODBURN, *Corresponding Secretary.*